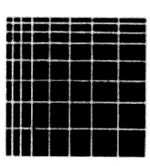
SuperGen®

Owner's Manual

Version 1.1



Digital Creations

CHAPTER 1 INTRODUCTION

1.1 Welcome

Thank you for selecting the finest and most flexible video overlay device for the Amiga Computer: the SuperGen Genlock. SuperGen has been designed by Progressive Image Technology and Digital Creations to bridge the gap of "Big Buck Video" technology and the budget minded video user. With SuperGen you can experience the wonderful world of Personal Video and Personal Computing combined: Desktop Video.

It is Progressive Image Technology's and Digital Creations' intent to not only provide a highly advanced, high quality genlock device, but to also provide outstanding product support. We are always happy to help our customers with any problems they may have; whether it's installing SuperGen or just a tricky configuration. We also encourage you to call or write to us with any comments about SuperGen. We really do listen.

Again, thank you for purchasing SuperGen. We hope you will enjoy it for a long time to come.

1.2 About SuperGen

SuperGen is a single printed circuit board within an enclosure. It has built-in genlock circuitry, RGB to NTSC Encoder, and Keyer. SuperGen is designed to plug into any of the Amiga computers.

SuperGen features include:

- Genlocks to external NTSC video (including 1/2" VCR's).
- Encodes Amiga RGB into NTSC video.
- Internal keyer for overlaying Amiga graphics onto external NTSC video.
- Selectable notch (rainbow) filter.
- Computer controllable dissolve of 64 levels.
- Dual fade (dissolve) controls.
- Selectable internal and external blanking source.
- Legal NTSC RS-170A output.
- Dual NTSC Output Connectors (1 for local, 1 for destination device).
- Loop Thru input video connector with selectable termination.
- Selectable key mode:
    1. Internal, using zero color to select dissolve control.
    2. Internal, using zero color to select computer controlled dissolve.
    3. Internal, using zero color biased by graphics dissolve control.
- Selectable input clamp.
- Field select.
- Commodore genlock compatible start line switch.

SuperGen was designed and is being manufactured by Progressive Image Technology.

FEDERAL COMMUNICATIONS COMMISSION RADIO AND TELEVISION INTERFERENCE STATEMENT

WARNING: The equipment described in this manual has been certified to comply with the limits for Class B computing devices, pursuant to Subpart J of Part 15 of FCC rules. Only peripherals (Computers, input/output devices, terminals, printers, etc.) certified to comply with Class B limits may be attached to this device.

Operation with non-certified peripherals is likely to result in interference to radio and TV reception. Also, this equipment must be used with shielded power cables and shielded I/O cables.

If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on when the radio or television is on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Re-orient the radio or television receiving antenna.
- Relocate the device with respect to the receiver.
- Move the device away from the receiver.
- Plug this device into a different outlet so that this device and the receiver are on different branch circuits.

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet prepared by the Federal Communications Commission helpful: "How to Identify and Resolve Radio-TV Interference Problems". This booklet is available from the U.S. Government Printing Office, Washington, DC 20402 by ordering Stock No. 004-00000345-4.

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For a period of **90 days** from the **date of delivery**, **Digital Creations** warrants to the original purchaser that the equipment and software disk described herein shall be free from defects in materials and workmanship under **normal use and service**. During this period, if a defect should occur, the equipment and/or software disk must be returned to **Digital Creations'** service facility by exactly following the return procedure outlined in Appendix A: "Trouble Shooting".

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1.3 About The Manual

This manual has five chapters: "Introduction", "Installation", "Operation", "Software", and "Video Concepts". Also, included are eight appendixes and a glossary.

The "Installation" chapter shows how to connect SuperGen to the Amiga, install video accessories, and run the necessary software. The "Operation" chapter shows how to operate the genlock's switches and sliders. The "Software" chapter contains information on all the SuperGen software. Finally, the "Video Concepts" chapter contains a basic tutorial on video and genlocking.

The appendixes have information on trouble shooting, broadcast hints, Amiga display modes, software interfaces, Amiga RGB connectors, RGB pot adjustments, general information, and specifications.

The glossary can be very helpful in finding the definition of the technical words and phrases used in this manual.

We assume for this manual that you are familiar with your Amiga hardware. You should also be familiar enough with either the Workbench or the CLI that you know how to copy disks, how to delete files, and how to copy files from one disk to another. If you are not familiar with all these procedures, we suggest you consult your Amiga User Guide before going any further.

1.4 Getting Started

Please fill out and mail the product registration card now. Mailing the registration card will protect your warranty and make you a registered owner for notification of future enhancements and new products.

Before going any further, duplicate the SuperGen Software disk. Put the original disk away and use only the copy as your working disk. Many people lose their software because they don't take this simple precaution.

TABLE OF CONTENTS

CHAPTER 1 INTRODUCTION
1.1 Welcome 1
1.2 About SuperGen 1
1.3 About The Manual 2
1.4 Getting Started 2
CHAPTER 2 INSTALLATION
2.1 Precautions 3
2.2 Requirements 3
2.3 Connectors 3
2.4 Connecting SuperGen To The Computer 5
2.5 Configurations 6
SuperGen As An Encoder 7
Recording The Encoded Amiga Computer Output 8
Overlaying A Pre-Recorded Video And Recording The Result 9
Overlaying Live Video And Recording The Result 10
SuperGen With A Switcher And External Sync 11
2.6 Software Installation 12
CHAPTER 3 OPERATION
3.1 Controls 13
Graphics Dissolve Slider 13
Background Dissolve Slider 13
Interpretive Dissolve Switch 14
Notch Filter Switch 14
Power/Lock LED 14
Remote LED 14
3.2 Dip Switches 15
3.3 Genlock Modes 16
Stand Alone Mode 16
Genlocked Mode 16
CHAPTER 4 SOFTWARE
4.1 About The Software 17
4.2 Libraries 17
4.3 DoLace 17
4.4 SGColorBars 18
4.5 SGHotKeys 18
4.6 SGJoyStick 19
CHAPTER 5 VIDEO CONCEPTS
5.1 Video 22
5.2 Genlocking 23
APPENDIXES
A TROUBLE SHOOTING 24
B BROADCAST HINTS 30
C AMIGA DISPLAY MODES 31
D SOFTWARE INTERFACES 33
E AMIGA RGB CONNECTORS 36
F RGB POT ADJUSTMENTS 37
G GENERAL INFORMATION 38
H SPECIFICATIONS 39
GLOSSARY 40

CHAPTER 2 INSTALLATION

2.1 Precautions

When handling any electronic equipment, care must be taken to prevent the possibility of inducing ESD (Electrostatic Discharge). In short, do not shock your computer or accessories.

A few precautions against ESD:

- Ground yourself often by touching a metal surface such as a computer or a power supply case.
- Do not wear polyester clothing.
- Keep the humidity between 70% and 90%.

2.2 Requirements

To install and use SuperGen, the minimum that you will need is an Amiga 500, 1000, or 2000 computer, an NTSC (composite) monitor, a copy of the SuperGen Software disk, and of course, SuperGen.

2.3 Connectors

This section describes the connectors on the back of SuperGen. Section 2.4 describes how to make the connections. **Please do not connect anything until you have read Section 2.4.**

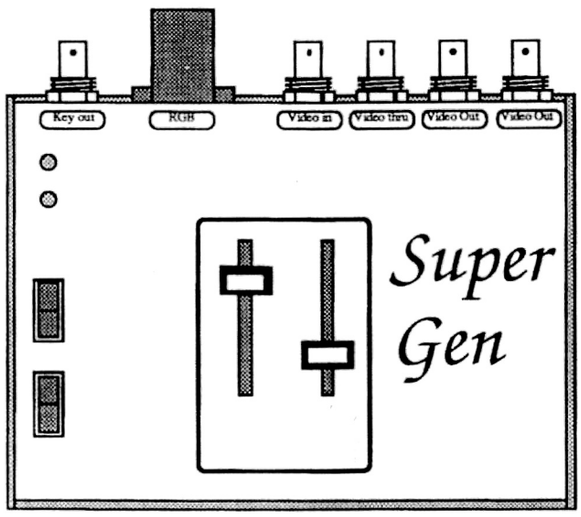

Figure 2.1
SuperGen Connectors

The connectors on SuperGen are:

- RGB In (Via attached cable)
- RGB Pass Thu (DB 25 converted to DB 23)
- Key Out (BNC Connector)
- Video In (BNC Connector)
- Video Thru (BNC Connector)
- Video Out (2) (BNC Connectors)

RGB In
The RGB In connector receives the RGB output from the Amiga Computer. The connector is actually a permanently attached ribbon cable designed to connect to the RGB port on the back of the Amiga Computer.

RGB Pass Thru
The RGB signal from the Amiga is passed through to this connector located just below the RGB In cable. It allows an RGB monitor to view Amiga graphics while the genlock is in use. Whenever the genlock is not in use, the monitor can still be used without having to remove the genlock from the configuration.

The RGB Thru uses a DB 25 connector. However, the RGB cable connecting the RGB monitor with the Amiga Computer uses a DB 23 connector. If you examine the RGB Thru connector, you will see that it has 2 pins removed on the right side to allow the connection of the RGB cable. The procedure on how to connect the RGB cable to the RGB Thru connector is outlined in Section 2.4.

Key Out
The Key Out provides a key signal which is used primarily by a device called a "switcher". However, not all switchers accept an external key. Check your switcher's manual to see if it accepts a key signal and if so, how it uses the signal.

The key signal tells when Amiga color 0 is present or not. The key signal is non-linear, which is either on or off, and can have its output level set to either 1 volt peak to peak or TTL voltage.

Video In
Source video is fed into SuperGen through the Video In connector. The source video signal can originate from a camera, a VTR with a pre-recorded tape, or a sync generator among others.

Video Thru
The video signal that is sent into the Video In connector is passed through untouched to the Video Thru connector.

Video Out
These connectors provide the combined output of the input video and the encoded Amiga RGB signal. Without the input video, the signal from Video Out is composed of just the encoded Amiga RGB. Both connectors provide exactly the same signal.

2.4 Connecting SuperGen To The Computer

This section contains detailed instructions on connecting SuperGen to the Amiga Computer and its RGB monitor. Please follow the instructions exactly. **ANY DEVIATION FROM THIS PROCEDURE MAY CAUSE DAMAGE TO SUPERGEN OR THE COMPUTER AND VOID YOUR WARRANTY.**

1. Unplug the power cords to the computer, monitor and accessories.

2. Touch a metal surface, such as the computer or power supply case, to discharge any static electricity. Take the precaution of grounding yourself often if you have noticed an abundance of static electricity.

3. Wait at least 15 seconds. This is to provide time for all voltages in the computer, monitor and accessories to be discharged.

4. Detach the RGB cable that connects the Amiga Computer to its monitor. As an aid to step 5, note where the RGB cable was attached to the computer.

5. **CAUTION!** - THIS STEP MUST BE FOLLOWED EXACTLY. CONNECTING THE RGB IN CABLE TO THE WRONG CONNECTOR WILL DAMAGE SUPERGEN AND/OR YOUR COMPUTER!

   Insert the RGB ribbon cable attached to the SuperGen into the RGB connector on the computer. If you have trouble finding the Amiga RGB connector, refer to your Amiga manual or Appendix "E" in this manual.

6. **CAUTION!** - THIS STEP MUST BE FOLLOWED EXACTLY. INCORRECTLY CONNECTING THE RGB CABLE TO THE RGB THRU CONNECTOR MAY DAMAGE SUPERGEN!

   Connect the RGB monitor to the RGB connector located at the rear of SuperGen, using the RGB cable from step 4. Be extra careful as the connector on the genlock has a hood designed for DB-25 and the RGB cable connector is a DB-23. The RGB cable connector must be flush with the left side of the genlock's RGB connector (See Figure 2.2).

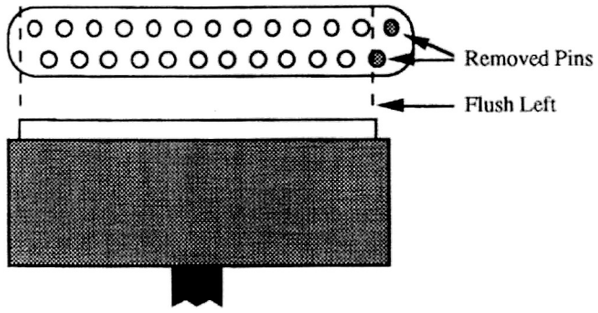

Figure 2.2
DB-23 Connector into DB-25 Hood

You have now completed the connection of SuperGen to the Amiga Computer. The next section covers the connection of SuperGen to video accessories.

2.5 Configurations

This section discusses the setup of five SuperGen configurations:

- Using SuperGen as an encoder.
- Recording the encoded Amiga Computer output.
- Overlaying a pre-recorded video and recording the result.
- Overlaying live video and recording the result.
- SuperGen with a switcher and external sync.

To make the connections between various video equipment and SuperGen requires NTSC (composite) cables with BNC connectors. If you're using equipment that requires RCA connectors, RCA to BNC adaptors are available at most video stores. We recommend that you use quality shielded video cables to insure good signal quality and that signal crosstalk is eliminated.

In the diagrams below it is possible for the NTSC and RGB monitors to be one in the same as is the case with the Amiga 1080 and 1084 monitors. Also note that arrows in the diagrams indicate the direction of the signal.

SuperGen As An Encoder

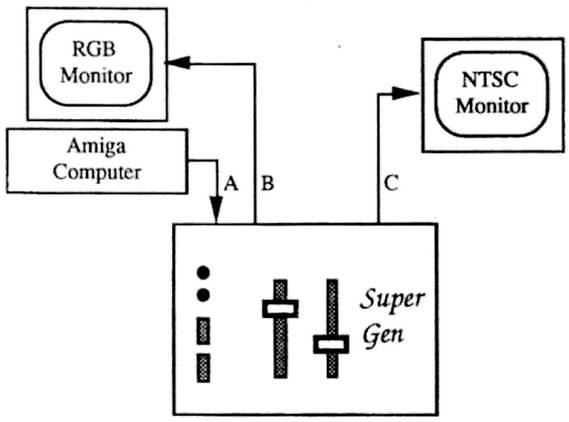

Figure 2.3
SuperGen As An Encoder

With just an Amiga, SuperGen can serve as an encoder. It can be used to create color NTSC output from an Amiga 500 or 2000 or used to improve color output from an Amiga 1000.

Note: Supplying the genlock with a stable external video source will produce an even better picture.

Connections are:

Line	From	To
A	RGB Out (Amiga)	RGB In (SuperGen)
B	RGB Out (SuperGen)	RGB In (RGB Monitor)
C	Video Out (SuperGen)	Video In (NTSC Monitor)

Recording The Encoded Amiga Computer Output

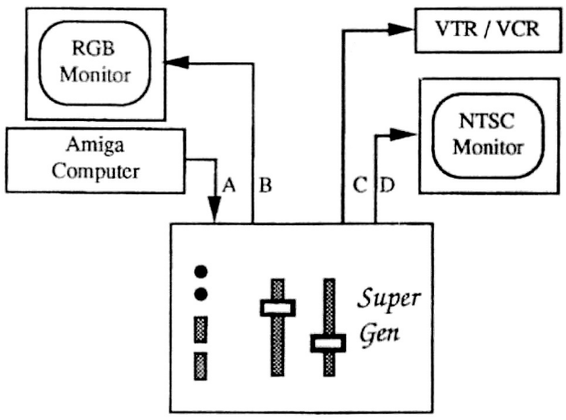

Figure 2.4
Recording The Encoded Amiga Computer Output

This configuration shows the Amiga graphics being encoded into composite and then sent over Video Out to the recorder. The optional NTSC monitor provides a way of seeing what is being recorded since both Video Out connectors have exactly the same output. The RGB monitor shows only the RGB output from the Amiga Computer.

When using the Amiga 500 or 2000 as an encoder, we recommend that you set the computer to interlace mode by running DoLace as explained in Section 2.6: "Software Installation".

Note: Supplying the genlock with a stable external video source will produce an even better picture.

Connections are:

Line	From	To
A	RGB Out (Amiga)	RGB In (SuperGen)
B	RGB Out (SuperGen)	RGB In (RGB Monitor)
C	Video Out (SuperGen)	Video In (VTR)
D	Video Out (SuperGen)	Video In (NTSC Monitor)

Overlaying A Pre-Recorded Video And Recording The Result

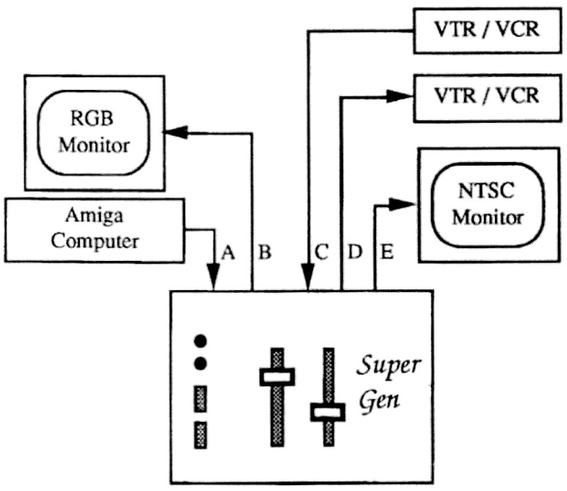

Figure 2.5
Overlaying a pre-recorded video and recording the result

This configuration shows the Amiga RGB graphics being encoded into composite and then combined with the video signal coming in on Video In from the source VTR. The combined signal is then sent out over Video Out to the destination VTR to be recorded. The optional NTSC monitor provides a way of seeing what is being recorded since both Video Out connectors have exactly the same output. The RGB monitor shows only the RGB graphics output from the Amiga Computer.

Connections are:

Line	From	To
A	RGB Out (Amiga)	RGB In (SuperGen)
B	RGB Out (SuperGen)	RGB In (RGB Monitor)
C	Video Out (Source VTR)	Video In (SuperGen)
D	Video Out (SuperGen)	Video In (Destination VTR)
E	Video Out (SuperGen)	Video In (NTSC Monitor)

Overlaying Live Video And Recording The Result

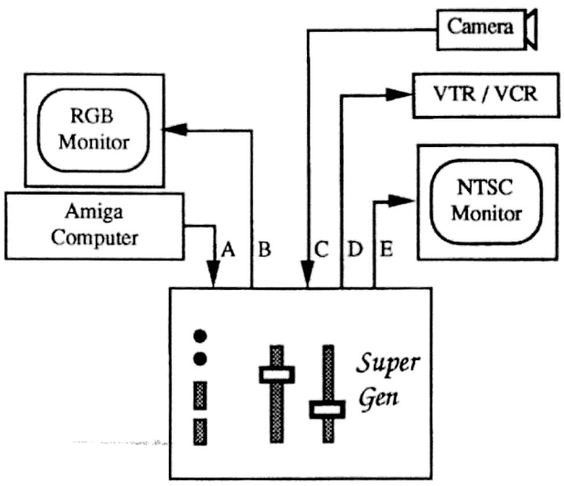

Figure 2.6
Overlaying live video and recording the result

This configuration shows the Amiga graphics being encoded into composite and then combined with the video signal coming in on Video In from the camera. The combined signal is then sent out over Video Out to the destination VTR to be recorded. The optional NTSC monitor provides a way of seeing what is being recorded since both Video Out connectors have exactly the same output. The RGB monitor shows only the RGB output from the Amiga Computer.

Connections are:

Line	From	To
A	RGB Out (Amiga)	RGB In (SuperGen)
B	RGB Out (SuperGen)	RGB In (RGB Monitor)
C	Video Out (Camera)	Video In (SuperGen)
D	Video Out (SuperGen)	Video In (VTR)
E	Video Out (SuperGen)	Video In (NTSC Monitor)

SuperGen With A Switcher And External Sync

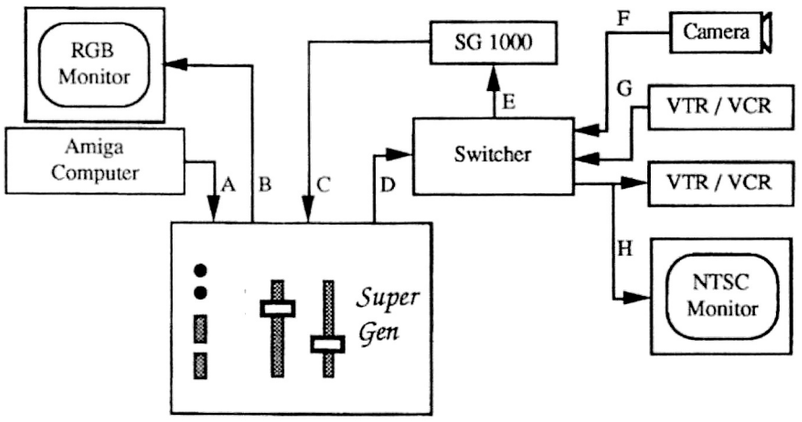

Figure 2.7
SuperGen With Switcher and SG 1000 External Sync

In Figure 2.7, SuperGen is used to genlock the Amiga Computer, time the graphics to an external reference, encode the RGB signal from the Amiga Computer into NTSC RS-170A and supply the signal to a switcher. This configuration incorporates Progressive Image Technology's SG-1000 (Source Synchronizer) to adjust the SC/H phase and the horizontal position of SuperGen's graphics with relation to the external sync provided by the switcher.

The switcher is used to combine the Amiga graphics with two video sources: the VTR and camera. The final result is sent to both an NTSC monitor and a VTR.

Connections are:

Line	From	To
A	RGB Out (Amiga)	RGB In (SuperGen)
B	RGB Out (SuperGen)	RGB In (RGB Monitor)
C	Color Black Out (SG 1000)	Video In (SuperGen)
D	Video Out (SuperGen)	Video In (Switcher)
E	Blackburst Out (Switcher)	Reference Video In (SG 1000)
F	Video Out (Camera)	Video In 1 (Switcher)
G	Video Out (VTR)	Video In 2 (Switcher)\
H	Video Out (Switcher)	Video In (VTR and NTSC Monitor)

2.6 Software Installation

The SuperGen Software Disk contains several programs which are designed to be used with SuperGen. This section covers only the installation of DoLace, a program that solves an interlace problem with the Amiga 500 and 2000 computers. If you are using an Amiga 1000 you can skip this section. See Chapter 4 for a complete explanation of all the programs on the SuperGen Software disk.

For SuperGen to provide RS170-A video it must have an interlaced signal from the computer attached to it. Unfortunately, Amiga 500 and 2000 computers do not configure themselves properly for interlaced operation. DoLace reconfigures them properly to provide the interlace signal.

DoLace is automatically run if you boot off the SuperGen Software disk. If you're booting off of another disk and you're using an Amiga 500 or 2000, you must run DoLace.

To run DoLace from the Workbench:

1. Place your copy of the SuperGen Software disk into an available drive.

2. Double-click on the DoLace icon. Your screen should now interlace.

To run DoLace from the CLI:

1. Place your copy of the SuperGen Software disk into an available drive.

2. Type "DoLace" in the CLI window and press the return key. Your screen should now interlace.

When running, DoLace does not show a window. The only indication that DoLace is active is that the screen interlaces. Running DoLace a second time will remove the interlace effect.

Note: Some applications take over the Amiga and then don't allow DoLace to be run. If the application offers interlace output, there is no need to run DoLace.

CHAPTER 3 OPERATION

3.1 Controls

This section describes the sliders, switches and indicators found on the top panel of SuperGen. All explanations refer to Figure 3.1.

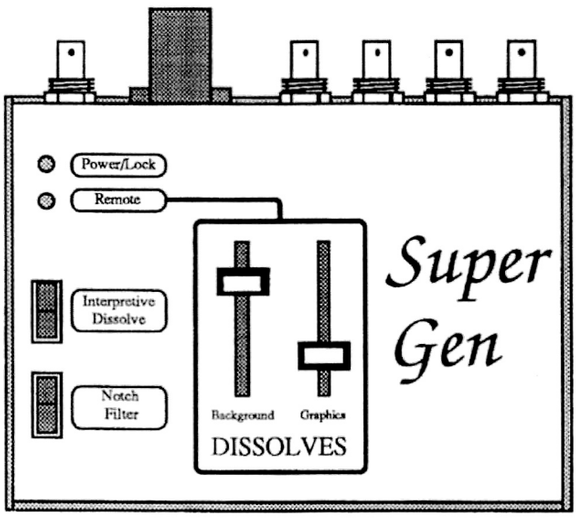

Figure 3.1
SuperGen Controls

Graphics Dissolve Slider
The Graphics Dissolve Slider controls the percentage of foreground colors against external video. The top position is 100% graphics (foreground colors) and 0% external video. The bottom is 100% external video and 0% graphics. Foreground colors are those that use color registers 1 through 31, extra half-bright, or HAM (see Appendix C: "Amiga Display Modes").

For example: If you have a picture of a butterfly drawn in foreground colors displayed on the Amiga, you can slowly fade it in by moving the Graphics Dissolve Slider from the bottom to the top. When the slider is positioned at the bottom, the butterfly is not displayed. As you move the slider up, the butterfly begins to show through the video. When the slider reaches the top, the butterfly will be opaque on top of the external video.

Note: The Graphics Dissolve slider does not operate unless SuperGen is locked to an external video source.

Background Dissolve Slider
The Background Dissolve Slider controls the percentage of background graphics against external video. The top position is 100% background graphics (background color) and 0% external video. The bottom is 100% external video and 0% background. The background color uses color register zero (see Appendix C: "Amiga Display Modes").

Note: The Background Dissolve Slider does not operate unless SuperGen is locked to an external video source.

Interpretive Dissolve Switch
The Interpretive Dissolve switch controls whether or not the "darkness" of an Amiga color is to be interpreted as a level of dissolve. If active, interpretive dissolve makes darker colors dissolve faster than lighter ones as the graphics slider is moved down toward 100% video.

Many interesting effects can be discovered through experimentation. A rolling effect can be produced by drawing, with a paint program, a series of vertical or horizontal bars that change gradually from white to black. Then, with the Interpretive Dissolve switch on and an external video source being fed into SuperGen, move the Graphics Dissolve slider up and down. Notice how the video shows through the darker bars faster than the lighter bars.

Notch Filter Switch
The Notch Filter switch controls a notch filter centered at 3.58 Mhz. The filter can be used to remove color artifacts ("rainbows") or some forms of flicker. Experiment with the filter to find the best display.

Power/Lock LED
The color of the Power/Lock LED indicates one of four states:

- Off - Power is off.
- Red - Power is on with no external video present.
- Yellow - Power is on with external video present but not NTSC 525 lines.
- Green - Power is on with external NTSC video present which is 525 lines.

Remote LED
The Remote LED indicates one of two states:

- Off - SuperGen Dissolve Sliders are under manual control.
- Red - SuperGen Dissolve Sliders are under software control.

Whenever the sliders are under software control (LED is red), they will not respond to user manipulation. SuperGen software that manipulates the slider settings are: SGHotKeys and SGJoystick. Other commercial software is also available which controls SuperGen.

3.2 Dip Switches

At the back of SuperGen is a small rectangular hole which allows access to a block of dip switches. The switches are numbered from left to right.

Switch	Name	Factory Setting
1	Termination	Down - Terminated
2	Blanking Source	Up - External Blanking, Internal if no video
3	Fast Tip Clamp	Up - Fast Tip Clamp on
4	Setup Adder	Down - Setup added
5	Key Level	Down - TTL voltage output
6	Unused	Down - Unused
7	Line Offset	Down - Line Offset is zero
8	Field Select	Down - Normal Field Select

Switch 1 (Termination)
With the switch in the down position, the Video Thru connector is terminated at 75 ohms. With the switch in the up position, the Video Thru is un-terminated. If the Video Thru is not terminated and no video device is connected to the Video Thru connector, the output levels of both Video Out connectors will be "hot".

Switch 2 (Blanking Source)
External blanking (switch up) will cause SuperGen to pass the external sync and blanking through untouched. Internal blanking (switch down) causes SuperGen to insert its own internally generated sync and blanking onto the video. With the switch up SuperGen automatically uses external blanking if external video is present and internal blanking if no external video is present.

The time to force internal blanking (switch down) is when the input video signal is very bad. In this instance the internal blanking may be better than the external blanking.

Switch 3 (Fast Tip Clamp)
To enable a fast sync clamp that sets up a quick DC restore set the switch up. Set the switch down to disable the fast sync clamp.

Switch 4 (Setup Adder)
Set the switch down for adding a setup of 7.5 IRE. Set the switch up for no setup. Adding setup is useful for matching the black levels of older equipment.

Switch 5 (Key Level)
Set the switch up for a key out level of 1 volt peak to peak 75 ohm terminated. Set the switch down to set the key out level to TTL levels. Be sure to select the proper level for your switcher when using the key out signal.

Switch 6 (Unused)

Switch 7 (Line offset)
The Commodore 1300 genlock exhibits an error with respect to the beginning of the overlay. To match this error SuperGen has a line offset switch. For Commodore 1300 genlock compatibility, set the switch to the up position. Otherwise set the switch down.

Switch 8 (Field Select)
Older Amiga 1000's start on odd fields while newer 1000's, 500's and 2000's start on even fields. Set the switch up for odd field select and down for even field select.

Unfortunately, there doesn't seem to be a standard way to tell an older Amiga 1000 from a newer one. One method that sometimes works is noting the absence of the extra half-bright graphics mode. This may indicate an older 1000. Most of time, trial and error is the only way to find the best display.

3.3 Genlock Modes

SuperGen operates in two different modes: "Stand Alone" and "Genlocked".

Stand Alone Mode
SuperGen is in Stand Alone mode whenever NTSC video is not present on the Video In connector. The signal, if any, is of such poor quality that SuperGen cannot genlock to it. In this event, SuperGen uses the video timing signals from its own blanking generator. This mode is indicated by the Power/Lock LED being red or yellow.

SuperGen does not allow dissolves in this mode since there is no genlockable external video to dissolve to. All you see on the composite monitor is the encoded Amiga RGB. SuperGen's filters function according to the switch setting. Also, the key signal is available on the Key Out connector.

SuperGen continues to monitor the Video In connector for the presence of video. If detected, SuperGen attempts to genlock to it. If the signal is good, SuperGen goes into Genlocked Mode.

Genlocked Mode
Whenever the genlock detects an NTSC video signal on the Video In connector, it goes into Genlocked Mode. This mode is indicated by the Power/Lock LED being green or sometimes yellow. If the LED is yellow, indicating a poor signal, SuperGen may still be able to genlock to it.

While in the Genlocked Mode all switches and controls are active. The filters will act as selected and the Blanking Source will remain as selected by the dip switch.

SuperGen will continue to monitor the incoming video looking for problems. If it finds that the input signal has been lost or become too corrupted to use, it goes into Stand Alone Mode.

CHAPTER 4 SOFTWARE

4.1 About The Software

This section describes all the software contained on the SuperGen Software disk. There are two libraries and four programs. The libraries are: supergen.library and copinit.library. The programs are: DoLace, SGColorBars, SGHotKeys, and SGJoystick.

The SuperGen Software disk contains the Workbench and is bootable.

4.2 Libraries

The two libraries: "supergen.library" and "copinit.library", contain software routines that manipulate the settings of the SuperGen Background and Graphics dissolves. Of all the programs on the disk only SGHotKeys and SGJoystick use the libraries. There are, however, other software companies that have written software that use the libraries.

The libraries must be present in the "libs:" subdirectory of the Workbench disk you use if you run SGHotKeys, SGJoystick or another company's program that uses the libraries. The SuperGen Software disk has the libraries in the correct location.

Copying the libraries onto a Workbench disk from the SuperGen Software disk:

1. Insert the SuperGen Software disk into the internal drive.
2. Reboot the computer.
3. Double-Click on the CLI icon.
4. Enter the CLI and type the following:
   copy libs:supergen.library to ram:
   copy libs:copinit.library to ram:
   copy c/copy to ram:
   cd ram:
5. Eject the SuperGen Software disk from the internal drive.
6. Insert the Workbench disk you want to load the libraries onto.
7. Type the following:
   copy supergen.library to df0:libs
   copy copinit.library to df0:libs

4.3 DoLace

DoLace is designed to correct a problem with the Amiga 500 and 2000 computers. For SuperGen to provide RS170-A video it must have an interlaced signal from the computer attached to it. Unfortunately, Amiga 500 and 2000 computers do not configure themselves properly for interlaced operation. DoLace reconfigures the computer to provide the interlace signal.

The SuperGen Software disk is set to run DoLace whenever you bootup from it. If you're using a different bootup disk and an Amiga 500 or 2000, you have to run DoLace before using SuperGen.

To run DoLace type "DoLace" in the CLI or double click on its icon on the Workbench. DoLace does not show a window, the only indication that it's running is that the screen interlaces. To stop the screen interlacing, run DoLace again.

Note: Some applications take over the Amiga and then don't allow DoLace to be run. If the application offers interlace output, there is no need to run DoLace.

4.4 SGColorBars

This is actually not a program but an IFF picture which consists of 75% SMPTE color bars for fine adjustment of the SuperGen (See Appendix F: "RGB Pot Adjustment").

To show the picture double-click on the SGColorBars icon. To quit the display click the mouse in the upper left corner of the picture.

4.5 SGHotKeys

This program allows the Amiga function keys to change both the SuperGen Graphics and Background dissolve settings. A key can be assigned to change either dissolve setting at a particular rate. Any function key assignment is referred to as a HotKey. A HotKey is invoked by pressing both the left-Amiga key and the function key at the same time. All control by SGHotKey is at priority level 8.

To run SGHotKeys from the CLI, type "SGHotKeys". From the Workbench, double-click on the "SGHotKeys" icon.

The program shows a window containing 4 rows of 10 gadgets. Each gadget can contain a numerical value. Each column represents a function key (HotKey): F1 through F10 going left to right. The top two rows represent slider settings and the bottom two rows represent their respective rates. Top to bottom the rows are:

Name	Affects	Range
Bgnd	Background Dissolve value	0 to 63 absolute, -63 to +63 relative, blank
Grph	Graphics Dissolve value	0 to 63 absolute, -63 to +63 relative, blank
BgVB	Background Dissolve rate	0 to 999, -1, blank
GrVB	Graphics Dissolve rate	0 to 999, -1, blank

Invoking a HotKey causes the SuperGen sliders to be set at the Background and Graphics Dissolve values. Values can range from 0 to 63 (top to bottom of the SuperGen sliders) with 63 for full video and 0 for full Amiga graphics. It can also be a relative value represented by a leading '+' or '-'. A relative value adjusts the slider setting by adding or subtracting the value from the present slider setting. For example: A slider setting of 50 and a dissolve value of -12 yields a final slider setting of 38 when the HotKey is invoked. If the dissolve value is 12 with no leading '+' or '-', the slider setting is set to 12 when the HotKey is invoked.

Note: A blank Background or Graphics Dissolve value does not affect its corresponding slider setting. If both values are blank, the HotKey function key is ignored. This allows you to use the HotKey combinations with other applications that use the same keys.

The Background and Graphics Dissolve rates indicate the speed that dissolve slider settings change. Values can range from 0 to 999 vertical blanks. A blank value is interpreted as 0 vertical blanks. Each vertical blank is 1/60 of a second; 60 vertical blanks for 1 second. If a value of 0 vertical blanks is used, the dissolve setting changes instantly when the HotKey is invoked. If no adjustment of a slider setting is desired, a rate of -1 is used. A blank value is interpreted as 0.

SGHotKey's menu consists of six items:

- **New**: Clears the HotKey definitions from the window.
- **Load**: Loads HotKey definitions from the HotKey data file.
- **Save**: Saves the HotKey definitions to the HotKey data file.
- **Background:** Closes the SGHotKey window. The program remains running and the HotKeys can be invoked. Run the program from the CLI or Workbench to make the window open again. An alternate method to choose Background is to click in the window close box.
- **Remote**: Toggles remote software control on and off. If this menu item is checked, SuperGen is under software control and the Remote LED is red. When this menu item is not checked, SuperGen is under manual control and the Remote LED is off. The menu item check may not reflect the state of the Remote LED if another program is also controlling the genlock.
- **Quit:** Quits the program.

Another way to invoke the Remote menu item is to press the Left Amiga and the Esc keys simultaneously. This is very handy when the window has been closed by the Background function since the menus are not available then.

The HotKey data file contains all the saved HotKey definitions. The default data file is "SGHotKeys.Data". The default data file is used if no other file is specified during startup or during execution of SGHotKeys. To use a different data file, type the file name after the program name in the CLI or double click on its icon. For example, to use HotKeys from a file called "MyHotKeys", type "SGHotKeys MyHotKeys" or double-click on the "MyHotKeys" icon. Doing this while SGHotKeys is running causes the HotKeys from the new file to be used. The file "MyHotKeys" would now be the HotKey data file that the Load and Save menu items act on.

4.6 SGJoyStick

This program allows a joystick to manipulate the SuperGen dissolve slider settings. Both the Graphics and Background Dissolve settings can be changed. The joystick is plugged into port 2 allowing the mouse to be used in port 1.

To run SGJoyStick from the CLI, type "SGJoyStick". From the Workbench, double-click on the SGJoyStick icon. To quit SGJoyStick type "SGJoyStick REMOVE=Y" from the CLI or double-click on the RemoveSGJoyStick icon.

SGJoyStick doesn't open a window or display anything. It uses the joystick positioning to control the SuperGen dissolve settings.

Double-clicking the joystick button toggles the SuperGen remote mode off and on. If the SuperGen Remote LED is red, the joystick can manipulate the dissolve settings. If it's off, the SuperGen sliders are in manual mode and the joystick does not affect the dissolve settings.

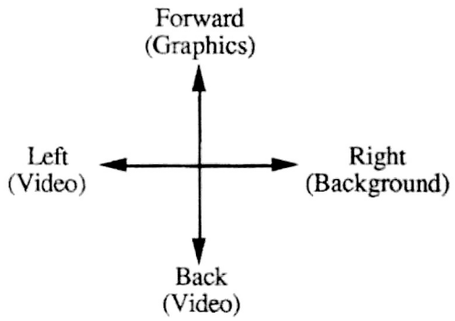

Figure 4.1
Joystick Positions

To select a dissolve rate hold the button down and move the joystick to one of the four positions. There are four dissolve rates, numbered 1 through 4, which can be set to any value between 0 and 999. The dissolve rate determines the speed at which the dissolve changes. The joystick positions, rate numbers, and defaults are:

Position	Rate Number	Default Rate
Forward	1	1 vertical blank
Right	2	16 vertical blanks
Back	3	32 vertical blanks
Left	4	64 vertical blanks

Note: A vertical blank is 1/60 of a second; 60 vertical blanks for 1 second.

Move the joystick to one of the four positions, without pressing the button, to adjust the dissolve slider settings. The joystick positions and their results are:

Position	Result
Forward	Changes Graphics Dissolve towards full graphics.
Right	Changes Background Dissolve towards full background.
Back	Changes Graphics Dissolve towards full external video.
Left	Changes Background Dissolve towards full external video.

Cross dissolves can be produced by moving the joystick between two positions. For example: Move the joystick between the Forward and Right positions to change both the Graphics and the Background Dissolve settings towards full Amiga display (both full graphics and background).

Different dissolve rates can be set one of two ways: by double-clicking on an icon from the Workbench or by adding parameters to the command line when running the program from the CLI.

To change dissolve rates from the Workbench, an icon must be created that contains the rates in the Tool Types field. It must also have "SGJoyStick" in the Default Tool field and have a file associated with it (See the Amiga Owner's Manual for help on icon fields). An example can be found in the "SGJoyStick.Data" icon.

The Tool Types field can contain any of the following commands:

- FORWARD=nnn (Set Rate 1)
- RIGHT=nnn (Set Rate 2)
- BACK=nnn (Set Rate 3)
- LEFT=nnn (Set Rate 4)
- REMOVE=c (Set remove status to either yes or no)

All of the commands must be entered in capital letters. The value "nnn" can range from 0 to 999 vertical blanks. The value "c" is either a 'Y' or a 'N'. If a command is not present, its default or present value will be used.

For example, if the two Tool Types fields looked like this:

FORWARD=10
LEFT=15

SGJoyStick would change Rate 1 (FORWARD) to 10 vertical blanks and Rate 4 (LEFT) to 15 vertical blanks. Both Rate 2 and Rate 3 would remain unchanged.

The Remove command tells SGJoyStick if it should quit. When the icon is double-clicked and the Remove command is set to "Y" (REMOVE=Y), SGJoyStick will quit. If set to "N" or if the command is not present, SGJoyStick will just read in the new rates. An example of the remove command can be found in the "RemoveSGJoyStick" icon located on the SuperGen Software disk.

To change the rates from the CLI type "SGJoyStick" followed by any of the commands used for the icon method above.

For example, typing "SGJoyStick FORWARD=5 LEFT=25" changes Rates 1 and 3 to 5 and 25 vertical blanks, respectively. Both Rates 2 and 3 remain unchanged.

CHAPTER 5 VIDEO CONCEPTS

5.1 Video

This section contains a brief discussion of NTSC (National Television System Committee) video. Video has two major components: the picture and the control information. The control component contains information about picture formatting such as vertical synchronization pulses and horizontal synchronization pulses.

The vertical synchronization pulse tells the monitor to place it's beam at the top left hand corner of it's screen. The beam then traverses across the screen displaying the picture information in a horizontal line.

The beam scans from left to right just as you would read a book. The beam continues scanning until the monitor receives a horizontal synchronization pulse. When the pulse arrives: the beam turns off, returns to the left hand side of the screen, and moves down two vertical positions. This event is called "retrace". The cycle of displaying picture information and retrace repeats until the television receives a vertical synchronization pulse. When this pulses arrives a complete field has been scanned onto the screen.

Broadcast NTSC has what is called "interlaced" video. Interlaced video requires two passes of the screen to complete one frame of the picture. Each pass of the screen is called a field with two fields making a frame. The first field has scan lines drawn on even rows and the second field has scan lines drawn on odd rows. Each field takes 1/60 of a second to complete. An entire frame of two fields takes 1/30 of a second. (See Figure 5.1).

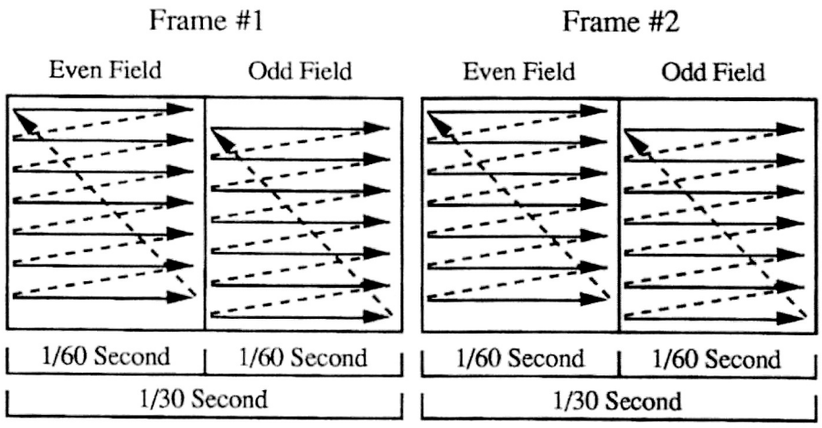

Figure 5.1
Time Domain

There are 262.5 lines per field or a total of 525 lines per frame. If you wish to see the half line, adjust your TV's vertical hold so the picture moves down on the screen. Examine the top of the screen to see that the first line of the picture starts somewhere near the center of the top row.

5.2 Genlocking

Genlocking is the process of two or more video signals combining together to produce one video signal. Without a device to synchronize the signals, the chances that the signals match perfectly are slim.

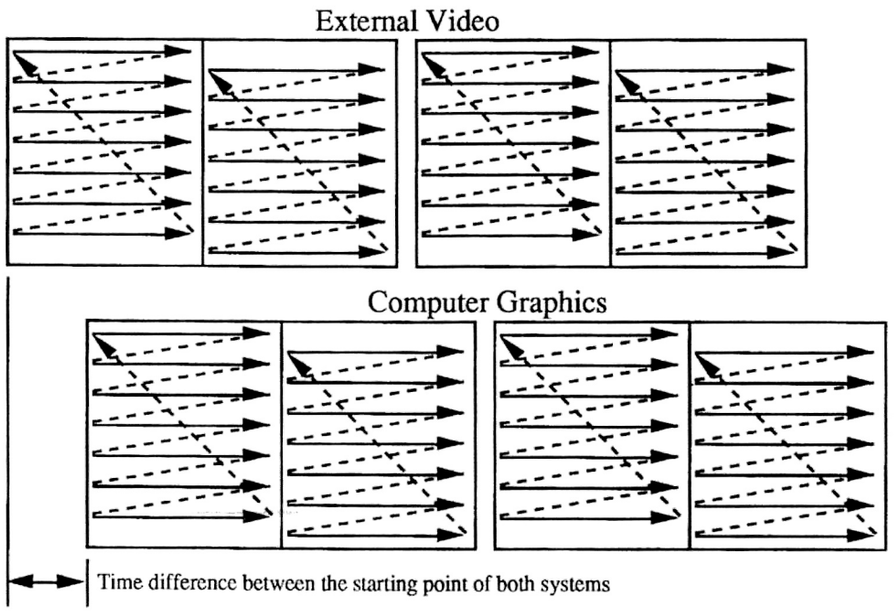

Figure 5.2
Time Difference

Figure 5.2 shows two video signals, external video and computer graphics, starting at two different times. The time difference must be corrected before the systems can merge (overlay). To correct the time difference, SuperGen sets the computer's graphics to synchronize with the external video. This is accomplished by timing the Amiga's clock with the external video. Once the two systems are synchronized, SuperGen has achieved genlock.

APPENDIX A TROUBLE SHOOTING

This section is intended to help you with problems that may occur while using SuperGen. This list of hints has been compiled from the most common problems submitted to us by our users and though our own analysis of various situations.

WARNING: Do not open the SuperGen! This will void the warranty. **There are no user serviceable parts inside.** Units that have been opened will be serviced at a premium rate of $150 an hour. Units damaged by user error but otherwise not opened will be serviced at $35 an hour. Parts are extra.

Repair Procedure
If you find that your SuperGen doesn't function properly, please follow these steps:

1. Find the symptom from the list below.

2. Try all the suggested solutions for the problem.

3. If the genlock still doesn't function properly, call Digital Creations' customer support at (916) 344-4825. If after talking with one of our representatives it is determined that the genlock needs repair, you will be given an RMA (Return Materials Authorization) number.

4. Carefully package the genlock along with a note detailing the symptoms and your system configuration. Be sure to put your return address and phone number on the note.

5. Send to:
   Digital Creations
   Customer Service, RMA (your RMA number goes here)
   2865 Sunrise Blvd. Suite 103
   Rancho Cordova, CA 95742

   Note: We cannot accept packages without a proper RMA number on the address label.

We have no way of knowing ahead of time how long it will take to repair a genlock. However, as a continuing commitment to our customers, we try to repair all genlocks as fast as possible. We ship all repaired genlocks via UPS Ground and COD any repair costs. If you wish a faster shipping time, please make arrangements with Customer Service. Any extra shipping costs will be added to the COD amount.

Note: Prices and policies are subject to change without notice.

Alternate Computer Test
If SuperGen doesn't seem to be working correctly, trying it on a different Amiga Computer can sometimes help isolate the problem. There is a chance that any particular problem may be caused by the computer. Known Amiga Computer problems include: defective power supplies and missing voltages on the RGB port. If SuperGen works on a different computer, the problem probably lies with the first computer.

Appendix A Trouble Shooting

Don't rule out the possibility of cables or accessories causing the problem. The general idea of this test is to isolate the offending item by process of elimination. In other words, try different combinations of computers, cables, and accessories until the SuperGen works or the problem is isolated. Trying to solve the problem this way may save you time and money.

RGB Connector Test
Some Amiga Computers are being shipped that have either defective power supplies or that have RGB ports that don't meet specifications. The RGB port should provide these voltages on the following pins:

Pin	Volts
21	- 5v (-12v for A500)
22	+ 12v
23	+ 5v

CAUTION: Care must be exercised when performing this test as it's very easy to short two pins while testing the voltages.

Trouble Shooting Hints

You Turn on the computer and nothing happens:

- SuperGen might not be correctly connected to your computer. Verify that the cable from the genlock is connected to the RGB/Video out port on the computer. **Connecting it elsewhere will cause damage to SuperGen.**
- Amiga might not be getting power.

You Don't see a picture on the NTSC (composite) monitor or the picture is distorted or tearing:

- SuperGen's Video Out might not be connected to the monitor's Video In.
- Monitor might not be set to composite mode.
- Video cables might be faulty.
- Amiga power supply might not be putting out the proper power. Check the voltage against the specifications in your Amiga Users Manual.

You Don't see an overlaid picture on the RGB monitor:

- The SuperGen is not designed to show an overlaid RGB signal. The RGB Thru connector on SuperGen provides just the RGB signal from the computer.

Appendix A Trouble Shooting

Unit won't Genlock and Power/Lock LED is yellow or red:

- External video might not be present or is not connected. Connect the video source to Video In on the SuperGen and then turn on the video source.
- Source video may not be good enough for the genlock to recognize as a video signal. Upgrade your equipment to provide a better signal.
- Source video might not be 262.5 lines per field or 525 lines per frame.
- Cables might be bad or not inserted completely.

RGB signal is rolling and has a green cast:

- The cable from your RGB monitor may have been connected to the back of SuperGen incorrectly. Check for bent pins on the genlock's connector. Be sure to match the holes of the monitor cable plug to the pins of the genlocks connector before applying force to make the connection. **Follow the connection instructions in Section 2.4 exactly**.

Flashing Rainbows are present or there is fringing of small details:

- Try the Notch filter.
- You may be using illegal NTSC graphics. See Appendix B: "Broadcast Considerations".

Computer Graphics are slightly fuzzy:

- Try setting the Notch filter off.

Video jitters up and down severely by more than 1/2 a scanline:

- Internal blanking might be on in a situation where it is not needed. Set dip switch #2 to the up position. Internal blanking is needed only for extreme cases where the existing sync info is very bad. Without external video, the SuperGen will automatically use its internal time base when dip switch #2 is up.
- Nothing might be wrong. Some interlace jitter is normal.

Appendix A Trouble Shooting

Video is coming out too "hot":

- Loop thru is not being used and it might not be terminated. Set dip switch #1 to the down position.
- The colors being encoded to NTSC on the Amiga might be too saturated. Refer to Appendix B: "Broadcast Considerations".
- The RGB pass thru might not be terminated. Attach your RGB monitor to the SuperGen. **Follow the connection instructions in Section 2.4.**
- A device might not be terminated at its end. Some monitors can be looped thru. Therefore, they must either have another connection or be terminated.

Video coming out of loop thru is dim:

- Loop thru might be terminated. Set dip switch #1 to the up position.

The colors being used are bleeding:

- Loop thru is being used and it might not be terminated. Set dip switch #1 to the down position.
- The colors being encoded to NTSC on the Amiga might be too saturated. Refer to Appendix B: "Broadcast Considerations".
- The RGB pass thru might not be terminated. Attach the RGB monitor to the SuperGen. **Follow the connection instructions in Section 2.4.**
- A device might not be terminated at its end. Some monitors, for instance, can be looped thru. Therefore they must either have another connection or be terminated.

Even though the sliders are in the 100% external video position and the remote LED is off, an image of the Amiga graphics persists:

- Cables might be poorly grounded, shielded or connected. This condition can cause a genlocked Amiga to induce a signal into the system via its own monochrome or color output. Invest in some quality video cables with BNC connectors.
- Ground loop might be present. Too many grounded video devices on one power circuit can cause cross-talk on the ground. Split the power to other outlets to isolate the grounds.

Appendix A Trouble Shooting

A slight horizontal bar is visible when there is solid color over the entire screen:

- Cables might be poorly grounded, shielded or connected. This condition can cause a genlocked Amiga to induce a signal into the system via its own monochrome or color output. Invest in some quality video cables with BNC connectors.
- Ground loop might be present. Too many grounded video devices on one power circuit can cause cross-talk on the ground. Split the power to other outlets to isolate the grounds.
- Setup may be on and not needed. Set dip switch #4 to the up position.

The NTSC image is shifted and the colors are wrong when using a switcher:

- Signal timing might be wrong. Since Sc/H phase adjustments are not available in the SuperGen, you must back time the signal to allow for the delay inherent though the unit.

The NTSC image is shifted but the colors seem ok:

- Software might not be centering correctly. Use preferences to set the centering.

Timing problems are evident and a switcher is being used:

- The 35 ns genlock delay might not have been accounted for.

The Amiga crashes during pre-roll or fast forward-rewind situations:

- Amiga might not be up to specifications. An Amiga which is being timed by video, via genlock, is at the mercy of that video. If a fast forward video signal is sent through the SuperGen, the Amiga that is attached is going to be timed faster than it can handle. Conditions that the software (system) relies upon are no longer present, thus the computer crashes.

The composite output is in B/W:

- Input video might be B/W. If color burst is absent in the input video, the output will be B/W regardless of what is being sent out of the Amiga.
- You might be using B/W monitor.
- SuperGen might be damaged. If color burst is present on the input video call Customer Support for assistance.

Appendix A Trouble Shooting

The RGB display is centered but the NTSC display is to the right:

- Nothing might be wrong. This is a normal condition if the difference between the two screens is about one fourth of an inch or less. The timing constraints of NTSC are different than RGB analog therefore the centering is different.

- SuperGen might be out of adjustment or damaged. If the NTSC display is much more than one fourth inch different, call Customer Support for assistance.

The Amiga will not boot with a SuperGen attached:

- Amiga might not have all its voltages present on the RGB connector. Check the voltages on the RGB port (see RGB Connector Test above).

- Amiga might not have its external clocking line within specifications.

- SuperGen may have been damaged by being plugged into the wrong port. Call Customer Support for assistance.

When SuperGen is set for 100% Amiga graphics, the external video shows through in little short lines:

- SuperGen may have been damaged by being plugged into the wrong port. Call Customer Support for assistance.

The Remote LED is on and the Power/Lock LED is green even without video input:

- Amiga power supply might not be up to specifications.

- SuperGen might be damaged. Call Customer Support for assistance.

SuperGen works sometimes but other times fails, or it works for a short period of time and then fails:

- Amiga power supply might be failing. If after a failure your SuperGen doesn't work until things cool down remove it and check the voltages of your Amiga (see Amiga RGB Connector Test above). If possible, check SuperGen on another Amiga (see Alternate Computer Test above).

- There might be a break in a cable. Gently wiggle the cables one at a time to see if there is a change in the situation. Replace the cables if possible.

- SuperGen might have a failing part that is heat sensitive. Call Customer Support for assistance.

APPENDIX B BROADCAST HINTS

SuperGen was designed with broadcasting in mind. However, it's up to you to provide a broadcast quality signal for SuperGen to operate at its maximum potential. Following are several hints that should help you create appropriate graphics.

The Amiga Computer can output fully saturated colors. These colors may cause a hum on the audio part of a broadcast signal, color bleeding, and exaggerated color crawl. Avoid this problem by choosing colors with RGB values less than 13 (Amiga RGB consists of red, green and blue values that range from 0 through 15). For instance, a safe color is R=12,G=12,B=7, a hot color is R=15,G=14,B=10. A special case is 100% white (R=15, G=15, B=15) which is legal but shouldn't be used as it can intrude into the broadcast guard band.

NTSC video is very different than RGB video. While designing art and text on an RGB monitor, it is very important to view your work on an NTSC (composite) monitor as often as possible. It is very easy to create a layout that looks great on an RGB monitor but looks terrible on an NTSC monitor. Also, make sure you check your work against every different external video background you intend to genlock with. Whenever possible, try to maximize the contrast between Amiga graphics and the video underneath to increase readability.

By watching network television you can see which techniques are used to create the best computer graphic overlays. Sports and commercials always seem to provide good examples. In most cases you will see color in relatively large areas of the picture and just detail (monochrome) in the smaller areas. However, even with large budget graphics there are times when color crawl is evident because they decide that color interaction considerations are not as important as color values. Experiment with a paint package, such as Deluxe PhotoLab, to explore how different color combinations and detail constraints react with external video.

Short list of tips:

- Avoid "hot" colors. Keep RGB values under 13.
- Don't create small patterns of alternating bright and dark colors. A checkerboard of pixels of black and white will cause rainbowing and artifacting.
- Outline edges of text with low saturated colors that contrast with the text. For example: Red text looks better with a dark gray or white border.
- Create smoother edges by using dark shades of the edge colors to create a strip along side them. Also, try using the highest resolution possible.
- For backgrounds, make sure the software you use can extend its screen far enough for an acceptable overscan (740 pixels by 440 lines).

APPENDIX C AMIGA DISPLAY MODES

This appendix offers a brief explanation of Amiga display modes and how colors are determined. To make the most of this appendix, you should be familiar with rudimentary binary arithmetic.

The Commodore Amiga has three graphics display modes: Normal, Hold and Modify, and Extra Half-Bright. Each display mode uses some or all of the 32 Amiga color registers. A color register holds the actual color to be displayed. A color consists of three components: red, green and blue. Each component can have a value that ranges from 0 (lowest intensity) to 15 (highest intensity). There are 4,096 (16 x 16 x 16) different colors possible.

Display memory is organized into bitplanes with each consisting of 0's and 1's. A color at a pixel (point on the screen) is derived by treating the bitplanes as if they were stacked on each other. By taking one bit (0 or 1) from the same spot on each bitplane, a color register can be indicated. For example: In normal graphics mode, a screen with one bitplane allows usage of color registers 0 and 1 as there is only one bit available per pixel position. A screen with three bitplanes allows usage of color registers 0 through 7 as there are three bits available per pixel position.

Normal graphics mode allows a screen to be from one to five bitplanes deep, thus up to 32 color registers can be used (0 to 31). Each pixel on the screen indicates a color register. When the color value in a color register is changed, all pixels that use that register change to the new color.

Extra Half-Bright is only available with six bitplanes. The first five bitplanes are used in the same way as Normal mode; they determine which of the 32 color registers are used for each pixel. The sixth bitplane tells how the color register is to be displayed. If it yields a bit which is 0, the color is displayed unaltered. If the bit is 1, the color will have its red, green and blue components reduced by half.

Hold and Modify (HAM) uses either six or five bitplanes and 16 color registers. The upper two or one (six or five bitplanes total) bitplanes define how to use the lower four bitplanes. If the upper bitplanes yield a value of 0, the lower four bitplanes define which color register to use (0 to 15). If the upper value is 1, the lower four bitplanes defines the value of the blue component. The other components (red and green) are taken from the pixel to the direct left. If the upper value is 2, the red component is replaced. If it is 3 the green is replaced. If HAM is used with 5 bitplanes, only upper values of 0 and 1 are possible.

HAM example: a pixel on the 10th row, 5 across, has a value of 13. Its color comes from color register 13 which contains Red = 10, Green = 5, Blue = 7. The next pixel across (position 6) has a value of 50 (upper = 3, lower = 2). The color displayed by that pixel will be red = 10, green = 2, blue = 7. Notice that the green value was changed from 5 to 2.

Screen width and heights on the Amiga are programmable by software. It is up to the program to make the screen large enough for adequate overscan. The chart below describes typical heights and widths available in each mode.

Appendix C Amiga Display Modes

Mode	STANDARD Height	STANDARD Width	OVERSCAN Height	OVERSCAN Width
Normal:				
Non-Interlaced, Lores	200	320	240	384
Non-Interlaced, Hires	200	640	240	768
Interlaced, Lores	400	320	480	384
Interlaced, Hires	400	640	480	768
Hold and Modify:				
Non-Interlaced, Lores	200	320	240	384
Non-Interlaced, Hires	n/a	n/a	n/a	n/a
Interlaced, Lores	400	320	480	384
Interlaced, Hires	n/a	n/a	n/a	n/a
Extra Half-Bright:				
Non-Interlaced, Lores	200	320	240	384
Non-Interlaced, Hires	n/a	n/a	n/a	n/a
Interlaced, Lores	400	320	480	384
Interlaced, Hires	n/a	n/a	n/a	n/a

With all the modes, the key value is determined by whether or not at least one bit is on in any pixel position. This means that foreground graphics are pixels that have at least one bit on and Background graphics are those pixels that have all bits off.

APPENDIX D SOFTWARE INTERFACES

This section is provided for people that wish to interface SuperGen with their own software.

The routines described here are in the C language format. If you're using Assembly or Basic, call the routines the same way you would call a ROM based routine. This method is outlined in the "Rom Kernal Reference Manual". There is C interface code in the DCInterface subdirectory of the SuperGen Software disk.

Library: SuperGen.Library

This library contains the main interface routines. The library is located in the libs: directory of the SuperGen Software disk. The routines are described below:

SuperGen

Sets the initial slider values and changes rates given that the priority or the request is high enough. Also, enables or disables software control of the SuperGen.

SYNOPSIS

SuperGen (Flags, BackGroundValue, BGnoVB, GraphicsValue, GnoVB)
d0 d1 d2 d3 d4

FUNCTION

Checks the high word of Flags to see if the priority is equal to or greater than the current priority. If not, exit the call, otherwise do as follows:

1. Check the low word of Flags to see if SuperGen is to be software controlled.

2. BackGroundValue and GraphicsValue are controlled by BGnoVB and GnoVB respectively. Their values are to be considered as targets to be ramped to form the current value at the time of the call.

3. If BGnoVB or GnoVB are negative then don't change to the respective values given in BackGroundValue or GraphicsValue. If BGnoVB or GnoVB are zero then change to the respective values given immediately. If the BGnoVB or GnoVB are non-zero use them as a count of the number of vertical blanks (60 per second) it will take for the current values to change to the respective target values.

INPUTS

Flags -- A long word value. Set the low word to a non-zero value if the SuperGen is to be controlled by software (enable word). If zero, the slider control values that would change will not affect the unit, but they can still be altered. The high word denotes the priority of the call. Its value may be set from 0 to 8. Zero has the lowest priority and 8 the highest.

BackGroundValue, GraphicsValue -- These parameters represent the desired slider value that is to be sent to the SuperGen over time or immediately.

A value of 63 represents 100% external video against Amiga graphics or background color. A value of 0 represents 100% Amiga graphics or background against external video.

BGnoVB, GnoVB -- Indicate the number of vertical blanks that will go by before the desired slider values are to be fully set. For example, if the current background slider has a value of 10 and the desired ending value is 50 then if the number of vertical blanks is set to 20 the current value will be incremented by 2 every vertical blank until 20 vertical blanks go by. When finished, the current value will be 50. If the number of vertical blanks is set to 0 the change will occur immediately. If it is negative no change will occur at all.

SuperGenPriority

Sets or clears the current priority.

SYNOPSYS

SuperGenPriority (Level, SetLevel)
d0 d1

FUNCTION

Given a priority level either set or clear the current priority level.

INPUTS

Level -- A value of 0 to 8, where 0 is the lowest and 8 is the highest.

SetLevel -- If TRUE the level will be set, if FALSE the level will be cleared to zero.

StatusGen

Reports the current status of slider values and priority.

SYNOPSYS
longword = StatusGen ()

FUNCTION
Returns a long word where the low word contains the background and graphics values in the high and low byte respectively. The high word contains the priority level and the enable condition in the high and low byte respectively. Please note that current slider values can be altered by other software using the this interface, beware of this when running more that one control program.

INPUTS
None

Library: Copinit.Library

The copinit.library is included for completeness. SuperGen does its magic by creating a special copper list that must be included at the very top of each and every copper list that is created by the system. We decided that the actual function of creating "master" copper instructions and placing them in the copinit structure should be in its own library. The copinit.library is opened and called from the supergen.library. Therefore, both libraries must exist in the "libs:" directory of the current system Workbench. The two routines are described as follows:

AddCopInit

Inserts a sublist of copper instructions into the system header.

SYNOPSYS
AddCopInit (CopperSubList)
a0

FUNCTION
This routine is used to insert a copper sublist into the initialization section of the system copperlist.

INPUTS
CopinitList -- A structure further defined in "copinit.h" in the DCIncludes subdirectory file.

DelCopInit

Delete a sublist of copper instructions from the system header.

SYNOPSYS
DelCopInit (CopinitList)
a0

FUNCTION
This routine is used to delete a copper sublist from the initialization section of the system copperlist.

INPUTS
CopinitList -- A structure further defined in the copinit.h file.

APPENDIX E AMIGA RGB CONNECTORS

The figures below show the RGB Out connectors for the Amiga 500, 1000 and 2000 computers.

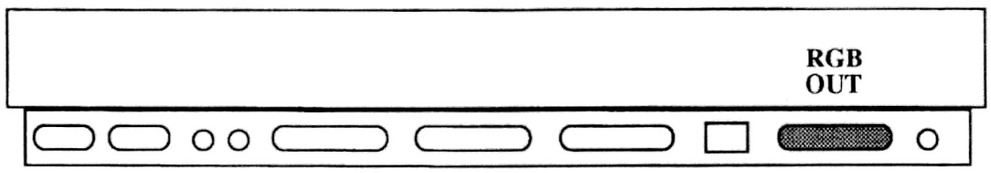

Figure F.1
Amiga 500 RGB Connector Location

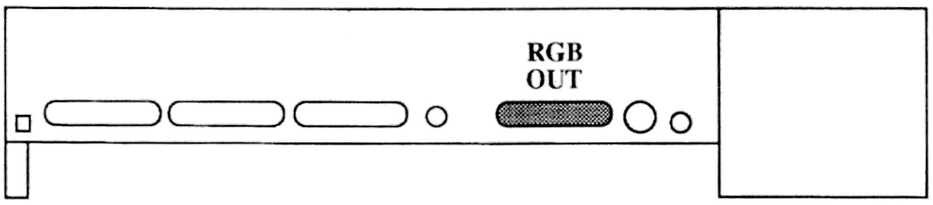

Figure F.2
Amiga 1000 RGB Connector Location

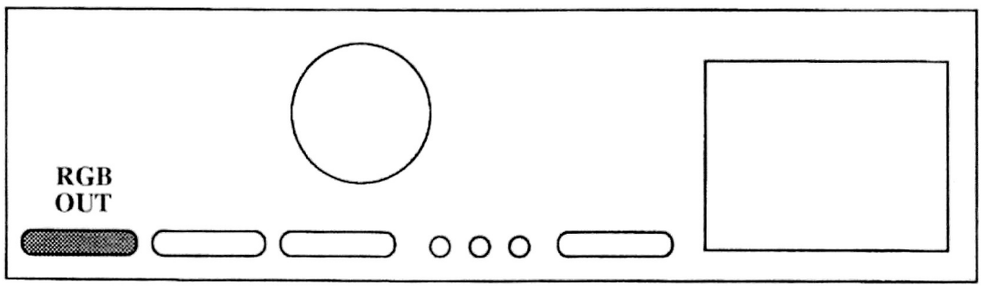

Figure F.3
Amiga 2000 RGB Connector Location

APPENDIX F RGB POT ADJUSTMENTS

Adjusting the input RGB levels is possible with the three 270 degree turn pots on the underside of the SuperGen. The pots are set at the factory and should not be adjusted by the user. A waveform monitor, an NTSC colorbar generator, a pot turning tool, and our tuning screen (SGColorBars) is required to perform this adjustment.

Warning: Performing this adjustment will **void** the SuperGen warranty. Only perform this adjustment if you feel it's absolutely necessary.

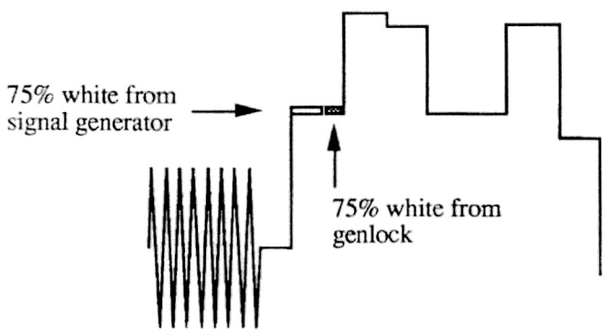

Figure 4.5
Waveform From Adjustment Session
(Not To Scale)

To adjust the RGB pots:

1. Peel off the warranty sticker (the one lying totally flat) to expose the access holes for the pots.
2. Attach the output from the signal generator to the Video In connector on SuperGen.
3. Attach Video Out to the input of the waveform monitor.
4. Attach SuperGen to the Amiga as usual (RGB port connection).
5. Turn on the Amiga and boot it with the SuperGen Software disk.
6. Run "SGColorBars" by double clicking on its icon.
7. Set the Graphics Slider to 100% and the Background Slider to 0%. You can now view the waveforms of the signal generator and those from SuperGen.
8. Turn each pot until 75% white from the Amiga is at minimum distortion when compared to 75% white from the signal generator. Remember, each pot only has about 270 degrees of travel, don't force it beyond its stops. Adjust one pot at a time.

APPENDIX G GENERAL INFORMATION

Questions regarding sales, technical matters and repairs should be addressed to:

Digital Creations, Inc.
Customer Support
2865 Sunrise Blvd. Suite 103
Rancho Cordova, CA 95742
(916) 344-4825

9:00 AM to 5:00 PM PST

SuperGen was designed and is being manufactured by:

Progressive Image Technology
322 East Bidwell Street
Folsom, CA 95630
(916) 985-7501

APPENDIX H SPECIFICATIONS

Power	-5 V 45 to 50 ma +5 V 100 to 110 ma +12 V 140 to 150 ma
NTSC Delay	~ 35 ns
Horizontal Phase Jitter	Less than 10 ns with clamp on.
Chroma Phase Jitter	Less than 2 degrees.
Encoder	Quadrature: 90 degrees ± 3 degrees Accuracy: Better than 5%
Bandwidth	Chroma: 1.2 MHz Luma: 4.2 MHz
Modulation Axis	R-Y, B-Y
Residual Noise on Graphics	-45 dB
Free Run 3.58 Mhz Frequency	±20 Hz at 15 degrees to 45 degrees centigrade.
Residual Chroma on Black	Less than 2 IRE
Color Lock Range	±150 Hz
Setup Add On	0 or +7.5 IRE
Horizontal Lock Range	15.734 KHz ± 1 KHz
D.C. Restorer	Blanking at 0 v ± 100 mV
Video Detect And Overlay Enable	Automatic Acquisition Time is approximately 4 to 5 fields. Release Time is approximately 20 lines
NTSC Passthru Bandwidth	DC -4.5 MHz; ±0.5 dB reference to white pulse.
NTSC Passthru Signal to Noise	Greater than -50 dB
Tilt (field squarewave signal)	1 IRE max with clamp on.

GLOSSARY

A500, A1000, A2000 - Shorthand for the three types of Amiga computers.

Aliasing - The effect caused by trying to represent detail higher than the resolution available. A good example of this is the jagged edges of straight lines in low resolution displays. One way to minimize this is to use graduated shades of color related to the graphic to soften the jagged edges.

Artifacting - Undesirable color information generated by using graphics which are too small for NTSC video to resolve. The result is that the color circuitry of a TV becomes confused and creates color where there is none.

Background - The part of the display output on an Amiga which is derived from color register zero.

Bit - A **BI**nary digi**T** which is either on or off (1 or 0). The values 0 through 4 appear as: 0, 1, 10, 11, 100. To represent the value 4 requires 3 binary digits.

Black Burst - A video signal used as a reference for video equipment in a studio so that they all can be synchronized. The signal itself has picture content which is all black.

Blanking - pulses used to extinguish the scanning electron beam at the vertical and horizontal retrace periods.

Bleeding - Also referred to as "color bleeding". When color seems to spill over the defined boundaries of a shape being viewed, it is bleeding. This effect is usually a result of using over -saturated colors or colors that are not good side by side in an NTCS environment.

BNC - British Naval Connector - A low noise connector used extensively in high frequency signal situations, such as television.

Clamping - The process of doing a DC restoration on a video signal.

Color Burst - The part of a video signal used to synchronize the color subcarrier oscillator of the device receiving it. It makes sure color information is being decoded properly when creating a video picture.

Color Sub-Carrier - The fundamental frequency on which color information is encoded. In NTSC video it is at 3.579545 Mhz.

Composite - Just another name for a NTSC signal. The signal itself is composed of many parts, thus the name composite. The primary components of a video signal are chrominance and luminance (color and detail).

Chrominance - The hue and saturation of a color. The signal on the color subcarrier has this information.

DC restore - The process of aligning all blanking and synchronizing pulses at the same level. This is accomplished by adding a DC voltage component that biases the AC signal pulses up to a reference blanking level that is the same for all fields. This restores the proper brightness relationship from field to field.

Glossary

Dip Switch - A small toggle switch that usually is packaged with several others in a **D**ual **I**nline **P**ackage.

Dissolve - A process which allows a percentage of one video signal to mix with another in an overlay. As the percentage increases the overlaid video will begin to obscure the video under it and at 100% will obscure it completely. Reducing the percentage will "dissolve" the overlaid video off of the video underneath it.

External Key - A key signal which is output for devices that accept a key from an outside source. Typically a switcher will accept such a signal.

Field - Part of an interlaced video signal. A field can be either all the odd or all the even lines of a Frame. Fields are displayed at the rate of 60 per second.

Frame - One pair of odd and even fields. An NTSC frame is displayed at the rate of 30 per second.

Graphics - The part of the display output on an Amiga which is derived from all the color registers being used except register zero.

Guard Band - An area in the bandwidth description which is allotted for keeping two adjacent channels from "stepping on each other".

Hot Colors - NTSC can only output colors which are composed within the constraints of its signal amplitude. Any color component which exceeds this amplitude will be considered "hot". Hot colors can intrude upon other aspects of the NTSC signal, such as the audio carrier, making it illegal for broadcast. Also known as "Illegal Colors".

IRE - A linear scale for measuring the relative amplitudes of the components of a video signal from a zero reference at blanking level. Picture information is on the positive side of the scale and synchronizing information on the negative side.

Key - The criteria for which one video signal can override another. As an example, whenever an Amiga outputs an indication that color register zero is being used the SuperGen can substitute its video input at that time such that it will override color register zeros' output.

Luminance - The amount of light intensity in other words: brightness. This part of a video signal is where all the detail information for the picture comes from.

Notch Filter - An electrical circuit that removes a predefined frequency from a signal. The notch filter in the SuperGen is specific to the color sub-carrier frequency of 3.579545 Mhz. Sometimes graphics can generate a harmonic at this frequency causing rainbowing. The notch filter will remove this.

NTSC - National Television System Committee. An group formed to create a broadcast standard for television. In 1953 they created a standard for color television that was accepted by the FCC.

NTSC Encoder - A device that takes RGB input and converts it to the NTSC standard signal for output.

Glossary

Overlay - A video signal that lays on top of an existing video signal. An overlay is created by some criteria (key) to allow it to supercede the video underneath it. With SuperGen the zero detect line provides this criteria.

Pixel - The smallest alterable element of a graphics display.

Rainbowing - A side effect of making graphics for display in NTSC video that are too small and also contrasting. A herringbone pattern of black and white shows this very prominently.

Retrace - The period in which the scanning electron beam goes from the end of a horizontal line to the beginning of the next line (horizontal retrace). Also the period in which the electron beam goes from the last line on the screen to the first (vertical retrace).

RGB - Red, Green and Blue. RGB video exists at a higher bandwidth than NTSC (9 MHz vs 4.2 MHz). In terms of horizontal lines of resolution the Amiga RGB signal can deliver far more than NTSC. Also it is not encoded and is essentially a video signal in its purest form.

RS-170A - The specific standard for a NTSC television broadcast signal.

Sc/H phase - Color subcarrier and horizontal phase. These two components of a video signal are affected by the delay inherent in all interconnections of video equipment. They must be in phase with other video signals for keying to work properly.

Setup - A term pertaining to the lowest level of black a video signal will have. With setup added the lowest black is 7.5 IRE, which is what older video equipment usually has. Some newer equipment can easily use a black level of zero IRE and therefore doesn't need setup.

Switcher - A device used to mix two or more video signals based upon one or more key signals.

Timebase Correction - A video signal ideally should have a very steady timebase where all the control signals occur synchronously. Devices such as a VTR or a laser disk have video signals that drift or jitter and are not consistent in time. A timebase corrector can be used to make such output steady and more useable, especially for broadcast situations.

VTR - Video Tape Recorder, a VCR is a type of VTR.

Zero detect - An output line on the RGB port of the Amiga which indicates when the zero color register is being used to create a part of a video signal.